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HOUSE OF COMMONS SESSION 1998–99

SCIENCE AND TECHNOLOGY COMMITTEE

First Report

SCIENTIFIC ADVISORY SYSTEM: GENETICALLY MODIFIED FOODS

Volume I

Report and Proceedings of the Committee

Ordered by The House of Commons *to be printed*
12th May 1999

LONDON : THE STATIONERY OFFICE
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The Science and Technology Committee is appointed under Standing Order No. 152 to examine the expenditure, administration and policy of the Office of Science and Technology and associated public bodies.

The Committee consists of 11 Members. It has a quorum of three. Unless the House otherwise orders, all Members nominated to the Committee continue to be Members of it for the remainder of the Parliament.

The Committee has power:

(a) to send for persons, papers and records, to sit notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time;

(b) to appoint specialist advisers either to supply information which is not readily available or to elucidate matters of complexity within the Committee's order of reference;

(c) to communicate to any other such committee and to the European Scrutiny Committee, to the Committee of Public Accounts, to the Deregulation Committee and to the Environmental Audit Committee its evidence and any other documents relating to matters of common interest; and

(d) to meet concurrently with any other such committee for the purposes of deliberating, taking evidence, or considering draft reports or with the European Scrutiny Committee or any sub-committee thereof for the purposes of deliberating or taking evidence.

The following were nominated Members of the Committee on 14 July 1997:

Mr David Atkinson	Mr Nigel Jones
Mr Nigel Beard	Dr Ashok Kumar
Dr Michael Clark	Mrs Caroline Spelman
Mrs Claire Curtis-Thomas	Dr Desmond Turner
Dr Ian Gibson	Dr Alan W. Williams
Dr Lynne Jones	

Dr Michael Clark was elected Chairman on 30 July 1997.

On 22 June 1998 Mrs Caroline Spelman was discharged from and Mrs Jacqui Lait added to the Committee.

On 30 November 1998 Mr David Atkinson was discharged from and Mr Ian Taylor added to the Committee.

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SUMMARY OF RECOMMENDATIONS AND CONCLUSIONS

(a) **Scientists and research institutions must recognise that they can have a major impact on public opinion, particularly when novel products are being considered. It is right that scientists should warn of possible health hazards but they must accept that such influence needs to be wielded with the utmost responsibility (paragraph 27).**

(b) **We recommend that directors of research establishments and university departments should take steps to ensure that all scientific staff are able to respond effectively and competently to media pressure. This is clearly not the case at present (paragraph 28).**

(c) **We recommend media coverage of scientific matters should be governed by a Code of Practice which stipulates that scientific stories should be factually accurate. Breaches of the Code of Practice should be referred to the Press Complaints Commission (paragraph 29).**

(d) **GM technology and its potential benefits may be permanently lost to the UK unless there is rational debate. The Government must provide leadership in this debate but it is also incumbent upon scientists to present findings clearly and in a manner not open to misconstruction and on the media to report accurately (paragraph 31).**

(e) **To reduce the risk of fraudulent use of GM free labels we recommend that the Government obliges retailers not to claim GM free status unless a full audit trail from seed to supermarket shelf is in place (paragraph 33).**

(f) **It is important that threshold levels for the labelling of GM foods are established and are understood by the public. Thresholds should be open to review as the technology to test for GM material improves. We recommend the Government pursues these objectives in its negotiations with European partners on labelling and thresholds and in other international fora (paragraph 34).**

(g) **The Government should press for international agreement on regulations requiring the separation of GM from conventional crops. These requirements should also be extended to include animal feed and meat products (paragraph 35).**

(h) **We recommend that the Government seeks to ensure that EU regulations permit local discretion in relation to specific farming practices and habitats in any particular region (paragraph 41).**

(i) **We recommend that the Government seeks to establish international agreement on what constitutes a 'valid' scientific reason; and that the definition of validity is based on the precautionary principle. We further recommend that the Government should press for Codex to find a means of reconciling the US, EU and UK approaches to GMO regulation (paragraph 42).**

(j) **We recommend that the Government avoids circumstances where large changes in the membership of scientific advisory committees are required at the same time (paragraph 46).**

(k) **We recommend that the Government rejects calls to include, as a matter of course, representatives of any particular interest on scientific advisory committees concerned with genetic modification technology (paragraph 47).**

(l) **We recommend that the Government rejects proposals to bar employees of biotechnology or food companies from serving on scientific advisory committees. It is vital that appointments to scientific advisory committees should continue to be**

made by selecting people with the most suitable and relevant expertise (paragraph 48).

(m) **We condemn the unjust attacks that have been made directly or indirectly against public-spirited scientists who have served the community well on both ACRE and ACNFP. We endorse Mr Meacher's view that the current members of ACRE who are employed by the biotechnology industry have acted properly and with integrity as have members of ACNFP (paragraph 50).**

(n) **We reject any suggestion that scientists' integrity is automatically compromised by association with industry. If scientists from academia or the public sector with research connections to the biotechnology industry were to be barred from the Government's scientific advisory system relating to GM crops and food the Government would be deprived of some of the best scientific expertise available. We agree with Mr Rooker that this would be "totally inappropriate" (paragraph 51).**

(o) **We agree with the Institution of Professionals, Managers and Specialists (IPMS) which argued that "serious thought ... needs to be given by Government to establish clear guidelines on disclosure of interest [for members of advisory committees] backed by active policies of annual disclosure, clear and transparent procedures for review of disclosures and clear criteria for decisions on whether interests are material" (paragraph 52).**

(p) **The Chief Scientific Adviser to the Government has explicitly set out the need "to involve at least some experts from other, not necessarily scientific, disciplines, to ensure that the evidence is subjected to a sufficiently questioning review from a wide ranging set of viewpoints". We agree. We recommend that such individuals should make up a fifth of the membership of advisory committees (paragraph 53).**

(q) **We recommend the use of the term lay member to refer to experts from other disciplines serving on scientific advisory committees (paragraph 54).**

(r) **We recommend that Government continues to drive for further openness by publishing ACNFP and ACRE papers and data (in full and summary form) and negotiating similar treatment of material from similar committees in other EU states. Such information should be published on the Internet for speed and accessibility as well as by conventional means. Summaries should be provided in plain English. We further recommend that, unless applicants can demonstrate that disclosure would cause commercial harm, all future meetings of ACRE and ACNFP should be held in public (paragraph 56).**

(s) **We believe that there should be a presumption in favour of public disclosure unless applicants can demonstrate that disclosure would cause commercial harm (paragraph 57).**

(t) **We do not believe that it would be either appropriate or practical for ACRE and ACNFP to do anything other than use an applicant's own data in their assessments. We agree with Novartis that "regulation by review of companies' risk assessments works well in pharmaceutical and pesticide regulation" and this is accepted by the public. Where inadequate information is provided, it is acceptable that further research is commissioned and paid for by the applicant (paragraph 58).**

(u) **We recommend that when ACNFP moves under the management of the Food Standards Agency, an appropriate part of MAFF's research budget be transferred to the Agency. Formal links should be established between DETR, the Foods Standards Agency, the Foresight programme and Research Councils so that ACNFP's and ACRE's longer-term basic research requirements can be considered. We recommend that the Minister for Science plays a strong role in ensuring proper**

coordination between the various research funding agencies and Departmental research programmes in this area (paragraph 59).

(v) **We recommend that the Government works with its European partners to investigate new approaches to the safety assessment of novel foods and commission appropriate research (paragraph 61).**

(w) **We welcome the Government's decision to extend ACRE's remit to include consideration of the cumulative impact of GM crops on biodiversity (paragraph 63).**

(x) **We believe that Directive 90/220 should be amended so that the cumulative effects of GMOs and their management on the environment and on biodiversity are assessed as part of all approvals for deliberate release (paragraph 64).**

(y) **We welcome the increase in publicly-funded research into the environmental impacts of GMOs. However, the Government's research programme should also take into account the concerns of organisations such as English Nature. It is disappointing that this is not yet occurring and Mr Meacher has undertaken to address this point (paragraph 65).**

(z) **There is already a *de facto* moratorium on commercial planting in place. GM crops may not be released into the environment without the necessary consent from the Government and no such consents have yet been issued for commercial growing. Government must make it absolutely clear that commercial growing will not be permitted without adequate information from farm-scale trials (paragraph 67).**

(aa) **We recommend that the Government supports efforts to find valid ways of monitoring any long-term impact on health of consuming GM foods (paragraph 68).**

(bb) **Individuals have a range of personal preferences and practices regarding food, some based on ethical or religious grounds. The Government must have a mechanism for addressing these issues; the scientific advisory system does not do so at present nor it is appropriate to require or expect it to (paragraph 71).**

(cc) **Ministers should obtain advice on these other, non-scientific, issues but should not seek such advice from the scientific advisory system. The Human Genetics Advisory Commission, charged with reporting on "issues arising from new developments in human genetics that can be expected to have wider social, ethical and/or economic consequences", provides a good model (paragraph 72).**

(dd) **We recommend that ACRE and ACNFP are merged to form an integrated committee which considers all scientific issues relating to GM food and crops and advises Ministers, Departments and, in the future, the Food Standards Agency. The specific functions of ACNFP and ACRE could then be delegated to sub-committees (paragraph 73).**

(ee) **The integrated committee should have a joint DETR, Office of Science and Technology, Department of Health and MAFF secretariat (with MAFF's role moving to the proposed Food Standards Agency when it is established) with a joint budget and joint departmental responsibility. Departmental Ministers should continue to be responsible and the Minister for Science should have a coordinating role (paragraph 74).**

(ff) **We therefore recommend that the Science Minister, with support from the Chief Scientific Adviser, bring forward proposals for a process audit procedure monitoring the work of all the scientific advisory bodies relating to genetic modification, not only in terms of ensuring that the system works cohesively but**

also auditing the functions of particular committees from time to time (paragraph 75).

(gg) **We find this observation worrying, especially as Professor Beringer's concerns on this matter had apparently not been drawn to the Minister's attention. We recommend that the Government looks closely at the staffing arrangements for scientific advisory committees and commits itself to providing large enough secretariats to ensure the efficient working of the Committees. The cost of extra staffing will be small compared with the cost of failure of the advisory system (paragraph 77).**

FIRST REPORT

The Science and Technology Committee has agreed to the following Report:—

SCIENTIFIC ADVISORY SYSTEM: GENETICALLY MODIFIED FOODS

PREFACE

1. In *The Use of Scientific Advice in Policy Making*, Sir Robert May, the Chief Scientific Adviser, stated that "Science is playing an increasingly influential role in contributing to the formulation both of UK and international ... policy and regulatory decisions".[1] Scientific advice is used to underpin Government activity in a broad range of fields but particularly in critical areas affecting health and safety, transport, and environmental protection and "Government needs to be sure that the systems which it has in place can provide scientific advice in a timely and effective manner".[2] The role of the scientific advisory system, its effectiveness and independence, are essential if Government is to fulfil its responsibilities.

2. We began our inquiry into the Scientific Advisory System last year and decided to proceed by conducting a number of case studies. This is the first of these.

3. We did not set out to answer all of the questions arising from the rapid scientific advances that for the last two decades or so have enabled scientists to modify the genetic makeup of plants and animals. Rather we used the genetic modification issue to test the scientific advisory system's contribution to the development of Government decisions, taking into account other factors and the wider political context.

Conduct of the Inquiry

4. In 8 oral evidence sessions we have heard from 13 sets of witnesses. Their expertise and insights have been supplemented by over 70 written submissions reflecting a broad range of opinion. We are grateful to all those who have assisted us during our inquiry either through oral or written evidence.

5. We would also like to thank our specialist advisers for this inquiry: Professor Michael Elves, former Director of the Office of Scientific and Educational Affairs, Glaxo Wellcome plc; Professor Alan Malcolm, Chief Executive of the Institute of Biology and Ms Julie Sheppard of the Consumers' Association.

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[1] Sir Robert May, *The Use of Scientific Advice in Policy Making*, March 1997, ("*The Use of Scientific Advice*") p. 1.

[2] Select Committee on Science and Technology, Session 1997-98, HC 796-i, p.1.

CHAPTER ONE: GENETIC MODIFICATION, ITS BENEFITS AND RISKS

What is Genetic Modification?

6. An organism's characteristics are determined by the information contained in its deoxyribonucleic acid (DNA) which carries the genetic information which in turn determines how individual cells, and consequently the entire organism, will develop and behave. This information is divided into individual units — the genes — "in the same way that a paragraph can be divided into individual words".[3] The characteristics displayed by a plant or animal will depend on which genes it has inherited and whether or not those genes are switched on, or 'expressed', to produce specific proteins.

7. For thousands of years mankind has sought to improve the growth, yield and other characteristics of cultivated crops by selecting and cross-breeding plants (which itself involves genetic modification) which have specific desirable characteristics. Conventional breeding involves a new plant shuffling many genes from each parent with thousands of genes recombining in large groups. This raises the possibility that an undesirable gene may also be introduced. Modern biotechnologists carry out genetic modification to change crop characteristics for similar reasons. The process of modern genetic modification, that is the transfer of genes from one type of organism to another, is the same as the process of conventional breeding but the sophisticated techniques which have been developed increase the scope of what can be achieved.

8. Modern techniques in biotechnology allow deliberate changes affecting a small number of genes. A single, pre-selected and desired gene, or group of genes, can be inserted into the DNA of the new plant. Genes can be introduced into an organism from an entirely different species. Such modification is not possible by conventional breeding. Genetic modification may also involve switching off a specific gene (or genes) thus removing its influence on the characteristics of the organism.

What GM products are grown or available in the UK?

9. In 1998 around 35 million hectares of genetically modified (GM) crops, including varieties of soya, maize, tomatoes, potatoes, cotton, tobacco and oilseed rape, were planted for commercial purposes worldwide, of which some 75% was in the USA.[4] Canada, Australia and China also have significant commercial plantings of GM crops. Europe, by contrast, although a leader in research and development in biotechnology, has been slower to adopt modern biotechnology techniques in agriculture, although they have been extensively and successfully used in the development of pharmaceuticals. Limited commercial plantings of GM maize in Spain and France in 1998 formed less than 1% of the global total.

10. There have been no commercial plantings of GM crops in the UK although GM crops have been planted for research and trial purposes. The area under cultivation in the UK for these purposes is expected to be around 300 hectares in 1999.

11. Three GM foods have been approved for sale in the UK to date. These are a tomato paste, derived from GM tomatoes with an altered ripening pattern, a type of soya which is resistant to a specific herbicide and a type of maize resistant to a different herbicide. Both soya and maize (GM and conventional varieties) are used in a wide range of processed food so GM ingredients are present in many food products on sale in the UK. A number of GM enzymes have also been approved for use in food production. For instance rennet, used in the production of cheese, which is traditionally derived from calves' stomach linings, can now be replaced by a GM version. (Consequently a broader variety of vegetarian cheese is now available). The cheese itself, however, contains no GM material. Refined food products derived from GM crops may also contain no remnant of GM material. For example, it is estimated that some 80 to 90% of

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[3] The Royal Society, *Genetically Modified Plants for Food Use*, ("*GM Plants for Food Use*"), September 1998, p. 4.

[4] Sir Robert May, *Genetically Modified Foods: Facts, Worries, Policies and Public Confidence*, ("*GM Foods: Facts, Worries, Policies and Public Confidence*") February 1999, p. 2; International Service for the Acquisition of Agri-biotech.

the global supply of soya oil is produced from GM crops and, although detectable traces of GM protein may appear in unrefined oils, such traces are removed by the refining process.[5]

Benefits and Risks

12. No human activity is entirely risk-free.[6] Certainly no food is.[7] This is not, however, a reason to trust unquestioningly in new technologies such as modern genetic modification. Risks must be identified, evaluated and minimised. However "scientific findings will not always produce the clear cut answers the public, the press and policy-makers might prefer".[8] Scientific committees advise in areas which are, by their nature, more uncertain than most. If the scientific advisory system is to function effectively all parties must accept the nature of its limitations in this regard. Science cannot offer people what they really want—total certainty. Scientists are seldom in a position to say 'never'. It is impossible to prove a negative. We agree with Dr Cunningham's statement that "There is no point in asking for certainty. We do not live in a world of absolutes; we do not live in a world of certainties".[9] What we can ask of the scientific advisory system is that it rigorously examines what is known, identifies where there are risks and uncertainties and explains to Ministers the extent to which such risks and uncertainties can be said to be a potential problem and how they can be minimised.

BENEFITS

13. GM foods potentially offer significant benefits for the public, producers and the food manufacturing industry. The Institute of Biology state that "we are certain that the potential for Genetically Modified ... Crops to contribute to the world's food supply is considerable".[10] The Chief Scientific Adviser has put the argument clearly, noting that modern intensive agricultural practices, with their high dependence on fossil fuels and chemicals, are not sustainable, he said "in the longer term we need to bioengineer crops which work with nature to reduce the need for intensive use of chemical fertilisers, pesticides, herbicides and fungicides".[11] He sees GM technology as producing an "agriculture which can feed the super-abundant human population but ... in a way which requires less input of pesticides, herbicides, chemicals".[12] Some witnesses argued that growing herbicide tolerant or pesticide resistant crops could result in the more effective use of agricultural chemicals and therefore lead to a reduction in the overall volume needed to control weeds and pests. Rather than having to spray crops with different selective herbicides to control weeds, farmers may be able to use fewer applications of a broad spectrum herbicide. English Nature told us that GM crops "have the potential to solve the environmental problems of intensive agriculture".[13] Monsanto told us that, following the introduction of GM cotton varieties in the USA, "the use of chemicals on cotton has been reduced by something like 80 to 90 per cent".[14] More immediate benefits to the consumer in the UK could include lower prices coupled with greater nutritional value or healthier food.[15] Zeneca have stated that "biotechnology has the potential to have a profound and beneficial impact on agriculture and the environment".[16]

14. The exploitation of GM technology could provide substantial economic benefits for countries with a strong science base. The UK's contribution to genetic research has been out of all proportion to its size and it is well placed to capitalise on such advances with companies such as Zeneca Plant Science running their own research programmes into GM foods and other

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[5] *GM Foods: Facts, Worries, Policies and Public Confidence*, p. 9

[6] *See* Ev. p. 298

[7] QQ. 765-767.

[8] Ev. p. 188

[9] Environmental Audit Committee, Fifth Report, Session 1998-99 on *GMOs and the Environment: Coordination of Government Policy*, HC 384, Q.185.

[10] *See* Institute of Biology, *Genetically Modified Crops, the Social and Ethical Issues*, August 1998, p. 2.

[11] *GM Foods: Facts, Worries, Policies and Public Confidence*, p. 19.

[12] HC 384, Q. 104.

[13] Ev. p. 64.

[14] Q. 406. *See also* Ev. p. 272.

[15] HC 384, QQ. 136–7

[16] House of Lords Select Committee on the European Communities, Second Report, 1998-99, on *EC Regulation of Genetic Modification in Agriculture*, HL Paper 11-II, p. 19.

international companies choosing to site their research centres here.[17] The Chief Scientific Adviser has pointed out that there is a huge potential market for GM food in Europe. Successive UK Governments and the European Commission have identified biotechnology as an area for future economic expansion.[18]

RISKS

15. It has also been argued that the exploitation of GM technology for food has considerable risks. These fall into two broad categories: risks to health and risks to the environment.

Risks to Health

16. Concerns over the consumption of GM food centre on four issues. The first is over the safety of the intentional changes made in the genetic make-up of crops, including consideration of any toxic or allergenic effects. For instance, some plants naturally produce toxins as a defence against pests. Generally these are either present at such low levels that they have no impact on the humans or animals which consume them or are eradicated by processing (eg cooking). Whilst genetic modification could remove or lower the level of allergens or toxins, it is also possible that levels could be increased.[19] Secondly, there is a possibility that unintentional changes may have occurred as a result of genetic modification.[20] Thirdly, it needs to be established whether a genetic modification will be inherited in a predictable manner over several plant generations. The fourth is whether modified genetic material could be transferred to organisms which occur naturally in the human gut. Of particular concern is the use of antibiotic resistance marker genes.

17. Antibiotic resistance marker genes have been used in the genetic modification process to allow researchers to trace transgenes.[21] Some suggest that the gene sequence conferring antibiotic resistance could be transferred to bacteria which colonise the human gut, and thereby assist in the spread of antibiotic resistance in humans.[22] The Advisory Committee on Novel Foods and Processes (ACNFP) assessed the risk associated with antibiotic resistance marker genes as extremely low but nevertheless recommended that researchers should stop using them and develop alternatives.[23] The spread of resistance to antibiotics is a serious threat to our ability to treat diseases but it is likely that the widespread use of antibiotic growth promoters and antibiotics as drugs are the causes of resistance, rather than the use of antibiotic resistance marker genes. The Advisory Committee on Releases to the Environment (ACRE) has made a similar statement and more recently the Royal Society has argued that "it is no longer acceptable to have antibiotic resistance genes present in new GM crops under development for potential use in foodstuffs". Alternatives are now available.[24]

Environmental Impacts

18. The direct effects of releasing GM plants into the environment have also raised some concerns. One, for example, is about "escaping genes"— where a GM plant may transfer its new genes to other plants. Transfer of genes between plants is a natural part of the normal

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[17] Parliamentary Office of Science and Technology, *Genetically Modified Foods: Benefits and Risks, Regulation and Public Acceptance*, ("POST, *GM Foods*"), May 1998, p. 46; European Commission White Paper, *Growth Competitiveness and Employment, Preparing the Next Stage*, 1994.

[18] Office of Science and Technology, *Allocation of the Science Budget, 1999-2000, 2000-2001, 2001-2002,* October 1998, p. 10.

[19] *See GM Plants for Food Use*, p.12.

[20] While the gene or group of genes to be transferred between organisms and any associated control elements can be accurately identified and isolated, it is not possible to specify exactly where, or how often, the gene will be inserted into the host's genome. Thus, whilst the characteristic of the transgene will be expressed by the host, it is not yet possible to predict accurately other effects modification may cause. Such unpredictable consequences can however be identified during testing afterwards.

[21] 'Transgene' is the term used to describe a gene transferred from one organism to another.

[22] *See* POST, *GM Foods*, p. 20.

[23] Advisory Committee on Novel Foods and Processes, *Report on the Use of Antibiotic Resistance Markers in Genetically Modified Food Organisms*, 1994.

[24] *GM Plants for Food Use*, p. 8.

evolutionary process and also occurs between unmodified plants. Should this happen repeatedly when genetic modifications have conferred tolerance to herbicides, it has been suggested that a new breed of plant which cannot be controlled with conventional herbicides — super-weeds as they have been termed — could emerge.[25] Such invasions also occur without genetic modification. For example, *Spartina Anglica*, a form of salt marsh grass, grows rampantly over British salt marshes and is a cross between a native species and an accidentally introduced species, neither of which themselves grows particularly well. Conventional crops, including organic crops, are vulnerable to cross pollenation and inadvertent chemical contamination. This is not an issue specific to genetically modified organisms (GMOs). Nor are GMOs likely to be the greatest source of contamination.

19. Biodiversity is an area of concern. Both English Nature and the Royal Society for the Protection of Birds (RSPB) state that biodiversity in the UK countryside has been in decline for a number of years. Some suggest that the cultivation of GM crops could exacerbate existing trends towards the intensification of agriculture which are in part responsible for this decline.[26] We have already noted that GM technology may reduce the use of chemicals in agriculture; but there are also arguments that cultivation of herbicide tolerant crops might allow extravagant use of herbicides which may, in turn, have an impact on plant life and consequently on the habitats and food supplies of wildlife. It has also been suggested that crops engineered to be pesticide resistant may harm non-target wildlife. Such concerns, of course, apply equally to conventionally bred crops which possess herbicide tolerance or pest resistance — an area which has received far less attention.

20. Others have pointed out that biotechnology should not be seen as the root cause of the biodiversity problems or the cause of intensive farming practices. Professor Beringer, the chair of ACRE, said the intensification of agriculture "is not a GM issue. GM is a minor part of that problem and maybe it is a solution to part of it".[27] The Chief Scientific Adviser too is concerned about the intensification of agriculture but stated that "if I had to identify one worry about the changing shape of the British countryside at the moment it would not be GM crops, it would be winter wheat, winter oil seed rape" and their effects.[28]

Public Values and Acceptability

21. Perceptions of risk and benefit play a large part in the decisions the public make over whether or not, and under what conditions, new technologies are acceptable. It can, however, take many years for technological breakthroughs to deliver widespread benefits. Consequently there is a potential risk that new technologies with the potential to deliver huge benefits may be lost in their infancy if public apprehension over risk, not balanced by immediate benefit, rises to such levels that commercial exploitation of the new technology becomes non-viable. Direct and immediate benefits to the consumer are likely to play a strong part in decision making. Also, in the case of GM foods, indeed any food, attitudes are not only dependent on an analytical assessment of risk and benefit. Other factors, such as ethical and moral considerations, knowledge of the technology and trust in the regulatory system, play a part. The Royal Commission on Environmental Pollution stated that "values are an essential element in decisions about environmental policies and standards".[29] This is no less true of decisions over the food we eat and the crops we grow.

22. The first clearance for the use of a GM material in food production in the UK was granted in 1990, when ACNFP consented to the use of a GM bakers' yeast in bread-making. Its introduction, and that of the GM rennet in cheese production, caused little concern on the part of the public.[30] Nor did the more high-profile launch of GM tomato paste in 1996 which Sainsbury's were the first to market. Sainsbury's experience illustrates a fundamental shift in

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[25] For example, the 'Roundup Ready' crops, marketed by Monsanto plc, are genetically modified to be tolerant to Monsanto's herbicide 'Roundup'.

[26] Ev. p. 280.

[27] Q. 583.

[28] HC. 384, Session 1998–99, Q. 105.

[29] Royal Commission on Environmental Pollution, Twenty-first Report, *Setting Environmental Standards*, October 1998,

[30] POST, *GM Foods*, p. 47.

public perceptions which has subsequently occurred. The paste was sold alongside its conventional equivalent but at a cheaper price and initially outsold the non-GM variety by 2:1.[31] During 1998 the volume of sales declined and "since Christmas [1998] it has reduced to a very low level indeed".[32] The paste is now being withdrawn because at the present sales rate it does "not justify its position on the shelves".[33] Sainsbury's, like many other food manufacturers and retailers, has decided to remove all GM ingredients from its own-brand goods. In every instance these decisions have been made on the basis of commercial judgement that consumers will demand choice, rather than any belief on the part of the companies concerned that the products they have been selling are unsafe.[34] Iceland, for instance, said that it had withdrawn GM ingredients from its own-brand products in response to customer concerns.[35] At the current rate at which food manufacturers are withdrawing GM ingredients or ingredients derived from GM sources from their products, there will be no market for GM food in this country.

23. As mentioned above, there are several factors which have played a part in affecting public attitudes towards GM food. A number of surveys has shown that a key factor in influencing public acceptability of GM food is consumer choice.[36] The first GM foods on the market in the UK were clearly labelled as such and non-GM alternatives were readily available. This has not been the case with other GM products such as soya and maize. Much of Europe's soya and maize comes from the US where producers, on the grounds that there is no significant difference between GM and non-GM plants, have not segregated crops and the Food and Drug Administration has not required labelling if GM products are substantially equivalent to their conventional counterparts (see paras 60-1). Thus European food processors and retailers had no way of telling whether any given batch of processed food was derived from or contained GM material. Sainsbury's told us that "It was extremely frustrating throughout 1996 and 1997 to see no action with the commodity crops" in the US and that they repeatedly asked "for a consistent treatment in terms of segregation. In the event that did not take place. The American Soya Bean Growers' Association, Monsanto and the trade associations confirmed that it could not be segregated on the farm, it could not be segregated in the supply stream".[37] Subsequent efforts by Sainsbury's and others have demonstrated that segregation is possible but in the interim UK consumers were precluded from making choices about whether or not to buy GM products.

24. Another factor contributing to the current antagonism towards GM food is the stance taken by established and influential lobby groups such as Greenpeace and Friends of the Earth, both of which have campaigned heavily against the introduction of GM foods. Greenpeace told us that it had no principled objections to GM technology *per se* but that its concerns resulted from an evaluation of the risks posed by release into the environment and the food chain and therefore was absolutely opposed to its use in food.[38] Campaigns, such as the Genetic Engineering Alliance's for a 5 year freeze on commercial plantings and imports of GM food and farm crops, on the basis that far too little is known about the consequences of widespread use, have exacerbated existing widespread concerns about the intensification of agriculture more generally.[39] Moreover some lobby groups have challenged the Government's scientific advisory system by calling into question the impartiality and integrity of those serving on committees (see paras 49-52).

25. The media, too, have played a key role in influencing public attitudes towards GM food. Sainsbury's found that initial media interest in GM food, at least in relation to the launch of their GM tomato paste, was "on the whole interested, curious, but fairly positive".[40] Monsanto's high profile advertising campaign during the summer of 1998 provoked further media interest and fuelled controversy. It added little to informed debate and provided fertile ground for the

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[31] Q. 644.
[32] Q. 650.
[33] Q. 650.
[34] Q. 5.
[35] Q. 1.
[36] POST, *GM Foods*, p. 47.
[37] Q. 644.
[38] QQ. 269 and 284-5.
[39] Genetic Engineering Alliance, *Five Year Freeze on Genetic Engineering and Patenting in Food and Farming*, p.1.
[40] Q. 644.

subsequent tone of media reporting. Against that background, one single incident would seem to have caused a fundamental shift in the tone of media reports.

DR PUSZTAI'S RESEARCH

26. On 10 August 1998, a *World in Action* programme was broadcast in which Dr Arpad Pusztai, then working at the Rowett Research Institute, claimed that "the effect [of feeding GM potatoes to rats] was slight growth retardation and an effect on the immune system. One of the genetically modified potatoes, after 110 days, made the rats less responsive to immune effects".[41] On the same day a Rowett Research Institute press release stated that feeding GM potatoes in experiments had led to reduced growth and immune functions and called for further research.[42] Dr Pusztai's assertions attracted massive, and unquestioning, media interest.[43] Two days later the Rowett published another press release announcing that Dr Pusztai had been suspended and would be retiring.[44] It transpired that Dr Pusztai's experiments involving GM material were incomplete and the Rowett Research Institute's press release had misreported the scientific findings of the experiments and, indeed, that the experiments referred to had not been carried out.[45] The announcement of Dr Pusztai's retirement further fuelled speculation that the authorities were attempting to suppress scientific evidence of potential dangers of GM foods and also led to Dr Pusztai receiving support from other scientists concerned at his treatment by the Institute. Moreover, Dr Pusztai's interpretation of his research data was disputed, not only by the Rowett Institute, but also by an independent statistical analysis, commissioned by Dr Pusztai himself, which found "no consistent pattern of changes in organ weights" and which questioned the validity of the design of the experiment.[46] Dr Pusztai told us that in his 110 day feeding trials, "no differences between parent and GM potatoes could be found". This directly contradicts his statement on *World in Action.*[47] Dr Pusztai's appearance before us attracted far more press interest than did some of our more credible witnesses. The press continues to give credibility to Dr Pusztai's claim despite it being contradicted by his own evidence.

27. A number of lessons can be learnt from this episode. The combination of naive media handling on the part of researchers and their institute pursuing a publicity agenda, aimed at securing research funding,[48] and irresponsible broadcasters in search of ratings, provided the perfect basis for the "total delirium, hysterical headlines and a series of alarmist, largely fact-free stories that suggested all ... GM foods were a threat to human health" that has followed.[49] **Scientists and research institutions must recognise that they can have a major impact on public opinion, particularly when novel products are being considered. It is right that scientists should warn of possible health hazards but they must accept that such influence needs to be wielded with the utmost responsibility.**

The Importance of Peer Review

28. For many years peer review in advance of publication has been accepted as the most appropriate way of ensuring scientific validity. As Professor Bainbridge, the chair of ACNFP, told us, "We must have open debate and peer review of the science—not science by press release".[50] In February 1999, nineteen Fellows of the Royal Society, stimulated by the Pusztai affair, said "it is a dangerous mistake ... to assume that all statements claiming to be scientific can be taken at face value. Good science is work that has stood up to detailed scrutiny by independent workers in the field and contributes to new knowledge and understanding. Those who start telling the media about alleged scientific results that have not first been thoroughly scrutinised and exposed to the scientific community serve only to mislead, with potentially very

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[41] *World in Action*, Granada TV, 10 August 1998.
[42] Rowett Research Institute, press release, 10 August 1998.
[43] Ev. p. 42.
[44] Rowett Research Institute, press release, 12 August 1998.
[45] Ev. p. 42; Q. 131.
[46] Q. 157.
[47] Ev. p. 20.
[48] Ev .p. 20.
[49] Robin McKie, in *Science and Public Affairs*, April 1999, p. 7.
[50] Ev. p. 88.

damaging consequences".[51] We fully support these sentiments. There need to be improvements in the way research institutes, universities and researchers present their results. Researchers and their employers must be aware of the implications of discussing partial findings publicly. **We recommend that directors of research establishments and university departments should take steps to ensure that all scientific staff are able to respond effectively and competently to media pressure. This is clearly not the case at present.**

Responsible Journalism

29. Journalists, too, must recognise the duty they have to report accurately, particularly on such sensitive issues as food and health. Since media interest in GM food was reawakened earlier this year there has been a continual succession of reports, implying that eating GM food would lead to all sorts of serious diseases, such as those which appeared in late April 1999 in several newspapers relating GM food to meningitis, but which are totally unsupported by evidence.[52] Not only do such stories jeopardise the future of a potentially beneficial technology but also cause undue worry and distress. Conversely, premature disclosure of technological breakthroughs raises unrealistic public expectations which may lead to disappointment. Science editors appear to be have been sidelined over this issue.[53] **We recommend media coverage of scientific matters should be governed by a Code of Practice which stipulates that scientific stories should be factually accurate. Breaches of the Code of Practice should be referred to the Press Complaints Commission.**

30. These media reports have resonated with understandable public scepticism towards the Government's handling of food matters following the BSE crisis and have formed the hostile background against which the scientific advisory system must deliver its advice to Government.

31. The risk the UK faces, should it prove impossible to return to a measured and informed debate on the issues relating to GM food and crops, is that any potential benefits from GM technology may be lost solely as the result of misconceptions. The Chief Scientific Adviser said that the UK must keep up with this technology because it "is a vital industry of the future. We have played a hugely disproportionate part in creating the underlying science: are we going to lose it like we lost things in the past?"[54] It would be deeply regrettable if the UK forfeited all the potential economic and social benefits offered by GM technology on the basis of unfounded scare stories. If the UK is to reject it, it should be on the basis of scientific assessments of identifiable risks or well-considered value judgements not the result of journalistic hyperbole and unfounded fear. We entirely agree with Mr Rooker MP, the Minister for Food Safety, that it is not for the Government to either promote or prevent the introduction of GM food.[55] However, the Government does have a role in ensuring that the public are adequately equipped to make informed choices. Blanket reassurances on safety are no more likely to promote rational debate or informed decision-making than some of the more extreme media coverage regarding GM foods that we have seen in recent weeks.[56] Scientific advice needs to be communicated to the public in a manner which sets out any uncertainties. The Government has a crucial role to play in explaining the risks and rewards associated with new technological developments and also in ensuring that the public has confidence in a regulatory system that is not seen to be beholden to commercial interests. We question whether the current controversy would have reached such heights if GM soya and maize had been segregated from conventional crops from the outset. **GM technology and its potential benefits may be permanently lost to the UK unless there is rational debate. The Government must provide leadership in this debate but it is also incumbent upon scientists to present findings clearly and in a manner not open to misconstruction and on the media to report accurately.**

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[51] Letter from 19 Fellows of the Royal Society to the national press, 22 February 1999.

[52] Eg *Sunday Times* 25.04.99; *Daily Mail*, 26.04.99. The claims of GM food links were based loosely on concerns that the use of antibiotic resistance marker genes may increase antibiotic resistance and hence decrease the value of antibiotics as therapeutic agents. In reality, the problem of antibiotic resistance is not a GM issue but is caused by widespread inappropriate use of antibiotics in agriculture and elsewhere.

[53] Ev. pp. 283-4.

[54] HC 384, Session 1998–9, Q. 105.

[55] Q. 725.

[56] Ev. p. 218.

Labelling

32. EU regulations require all new GM foods to be labelled as such. The regulations do not apply to GM additives or to derivatives of GM crops, such as tomato paste or refined vegetable oils, which contain no modified constituents. The Government intends to 'gold plate' these regulations by imposing additional requirements in the UK. It is also pressing the European Commission to bring forward proposals for labelling rules for GM additives. The Commission is currently developing proposals for thresholds for labelling of GM foods.

33. The current EU regulations are based on the premise that labelling requirements should only apply where the accuracy of labels can be checked by testing the product. This may meet the requirements of those who do not wish to consume GM material, but cannot address the concerns of those who do not wish to consume food derived from, or processed with, GM technologies where no modified material remains in the final product. Many retailers are actively promoting the fact that they will soon have no GM derived ingredients in their products and consumers will be making choices based on these policies. Such claims are not at present covered by the GM food labelling requirements and in many cases there is no scientific means of testing the final product in question to establish the validity of assertions of GM status. **To reduce the risk of fraudulent use of GM free labels we recommend that the Government obliges retailers not to claim GM free status unless a full audit trail from seed to supermarket shelf is in place.**

34. Professor Bainbridge was strongly supportive of labelling for food derived from GM crops but pointed out that, if labelling were to be fully effective, it would be necessary to reach agreement on thresholds.[57] Sainsbury's told us that if agreement were not reached on thresholds all the effort that had already been put into developing a labelling regime would be wasted as the system would not be trusted.[58] We agree. **It is important that threshold levels for the labelling of GM foods are established and are understood by the public. Thresholds should be open to review as the technology to test for GM material improves. We recommend the Government pursues these objectives in its negotiations with European partners on labelling and thresholds and in other international fora.**

35. The Country Landowners' Association told us that effective and meaningful labelling was also dependent on crop segregation "without proper segregation of GM from conventional crops it will be impossible to label products as GM free".[59] There has been debate over whether segregation, at least in the volumes required, is practical.[60] Professor Bainbridge told us that she considered that segregation was possible at present, but she was unsure whether it would continue to be so.[61] Similarly, Sainsbury's were not sure whether they would be able to continue to identify sources of segregated crops in the long term, although they were confident that "if there is a market requirement ... and a market demand of value to the grower and the supply chain then it can be achieved". We also acknowledge the argument made by the Country Landowners' Association that an extension of labelling requirements to animal feed products would enable farmers to make more informed choices regarding their farming practices and to pass on better information to their customers.[62] **The Government should press for international agreement on regulations requiring the separation of GM from conventional crops. These requirements should also be extended to include animal feed and meat products.**

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[57] Q. 509.
[58] Q. 701.
[59] Ev. p. 220.
[60] Ev. p. 1.
[61] Q. 507.
[62] Ev. p. 220.

CHAPTER TWO: THE SCIENTIFIC ADVISORY SYSTEM FOR GENETICALLY MODIFIED FOOD

The Advisory and Regulatory Systems concerning GM Food and Crops

36. The Government's first priority in respect of food regulation is to "protect public health in relation to food by promoting and enforcing high standards of safety at all stages of its production, processing and supply".[63] Research and cultivation of GM crops and their use in food is "tightly" regulated and operates at both UK and EU levels.[64] Both EU and UK regulation is based on the precautionary principle. In practice this means that strong evidence is required that a genetically modified organism (GMO) presents a very low risk before consent is given for its use.

37. The current regulatory regime relating to GM crops and food had its origins in the 1970s when researchers were the first to call for, and achieve, a voluntary moratorium. From 1978 any work involving genetic modification had to be notified to the Genetic Manipulation Advisory Group and the Health and Safety Executive (HSE). The Genetic Manipulation Advisory Group was replaced in 1984 by the Advisory Committee on Genetic Modification (ACGM) which is still the body responsible for advising the HSE on the contained (i.e. laboratory) use of GMOs. Responsibility for regulation and the provision of advice on other aspects of genetic modification has since been passed to other authorities, chiefly the Advisory Committee on Releases to the Environment (ACRE) and the Advisory Committee on Novel Foods and Processes (ACNFP) although there is a number of other expert bodies within the scientific advisory system which the Government may call upon. MAFF told us that "in all the Government has access to some 60 experts when seeking advice on the safety of GM Foods".[65]

REGULATION OF RELEASES OF GMOs TO THE ENVIRONMENT

38. Releases to the environment are regulated in the UK under the Genetically Modified Organisms (Deliberate Release) Regulations 1992, which implemented EU Directive 90/220. The competent authority in the UK is the Department of the Environment, Transport and the Regions (DETR), advised by ACRE which was established under the Environmental Protection Act 1990. That Act also introduced a structured regime of notification and risk assessment which was designed to prevent or minimise "any damage to the environment which may arise from the escape or release" of GMOs.[66] Any release into the environment of a GMO, from growing a single plant in a pot to large-scale commercial planting of a crop, must be notified to, and in many cases authorised by, the Secretary of State for the Environment, Transport and the Regions.[67] Applications for releases must be accompanied by comprehensive information including an environmental risk assessment, details of the nature of the organism, the origins and types of gene sequences to be transferred and the transfer technique.[68] Applications to market GMOs follow a similar procedure but must also be approved at EU level. For successful applicants these procedures result in a European Union-wide permit to grow commercially or market their product.

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[63] Ev. p. 137

[64] *GM Plants for Food Use*, p. 3.

[65] Ev. p. 138.

[66] Environmental Protection Act 1990, Section 106(1).

[67] Or to the Secretaries of State for Scotland and Wales as appropriate. Separate, but similar, provisions apply in Northern Ireland.

[68] Ev. p. 135; POST, *GM Foods*, p. 23.

The EU and UK Regulatory System		
Stage	**UK regulation**	**EC Directive/Action**
Laboratory Research	HSE advised by ACGM	Directive 90/219
Experimental Release (growing plants outdoors, field trials and cultivation)	DETR advised by ACRE	Directive 90/220 Details of all releases circulated to all EU States
Marketing (I)consent to market GM food in the EU; (II)consent to market GM seed; (III)labelling	MAFF/Department of Health advised by ACNFP and other committees	(I)Marketing consents sent to all EU States (II)Directive 90/220 plus various seeds Directives (III)Novel Food Regulation 1997

Source: Parliamentary Office of Science and Technology, POST Note 115, May 1998.

REGULATION OF GM FOOD

39. Until 1997 the UK operated its own approval system for all food derived from GM crops or containing GM ingredients. In May 1997 the EU Novel Foods and Novel Food Ingredients Regulations, which set community-wide standards for safety assessments of novel foods, came into effect. The competent authority in the UK is currently the Ministry of Agriculture, Fisheries and Food (MAFF) although the Food Standards Agency will take on this responsibility if the necessary legislation comes into force.[69] MAFF is advised by ACNFP. Under the EU Regulations companies wishing to market new GM food products must apply to the Member State in whose territory they first intend to market their product so that a safety assessment can be carried out. Applicants are required to provide detailed information about the genes and organisms involved, the processes used for genetic modification, the nature of the food product and any processing involved.[70] The Member State then has 90 days to reach a conclusion after which a report is circulated to all other Member States. Member States can raise objections within 60 days. If objections have a scientific or technical basis and cannot be easily resolved, the EU Scientific Committee for Food makes an assessment which forms the basis for a final decision taken jointly by all Member States on the basis of qualified majority voting.[71] Once a GM food has gained marketing consent in one Member State, it may then be sold throughout the EU.

40. Both ACRE and ACNFP may seek guidance from other scientific advisory committees as necessary. Typically these might include the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, the Committee on Medical Aspects of Food and Nutritional Policy, the Advisory Committee on the Microbiological Safety of Food and the Advisory Committee on Pesticides. In addition they may also draw on the expertise of the Food Advisory Committee on such matters as that of labelling.

THE EU-UK RELATIONSHIP

41. Decisions regarding the commercial release of GMOs are made at EU level through qualified majority voting. Once a consent has been granted for a GM crop, no individual Member State can ban its use, even if the assessment work on environmental impact has been done elsewhere. English Nature believes that "given the difference between wildlife habitats and distribution across Europe, and differences in farming practices, ... it would be better to

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[69] Ev. p. 136.

[70] For details, see "Commission Recommendation of 29 July 1997 concerning the scientific aspects and the presentation of information necessary to support applications for the placing on the market of novel foods and novel food ingredients and the preparation of initial assessment reports under Regulation (EC) No 258/97 of the European Parliament and of the Council", Official Journal of the European Communities, L253, 16 September 1997.

[71] The Scientific Committee for Food consists of up to 19 scientific experts appointed by the European Commission.

allow subsidiarity in marketing approvals".[72] We believe that subsidiarity in this area would prove unnecessary in the majority of cases and would increase the workload of advisory committees significantly without any tangible benefit. The House of Lords European Communities Committee suggested that "Member States should have the right to opt-out of growing certain GM crops for domestic or environmental reasons".[73] The Government has rejected this proposal, stating that it sees "no reason for Member States to impose additional restrictions" and that the current provisions of Directive 90/220 are, in this regard, satisfactory to ensure the protection of the environment.[74] This is at odds with Mr Meacher's evidence to the House of Lords Committee that the Government was seeking to ensure that the scope of the Directive and environmental risk assessments were broad enough to cover direct and indirect effects of GMOs.[75] Even if that were to be achieved, it would not necessarily address concerns about differences in habitat and farming practices. Professor Beringer told us "normally if you have European marketing approval it applies everywhere ... If there is sufficient concern that it needs to be limited, then it probably should not be grown".[76] **We recommend that the Government seeks to ensure that EU regulations permit local discretion in relation to specific farming practices and habitats in any particular region.**

INTERNATIONAL AND TRADE CONSIDERATIONS

42. The application of the precautionary principle results in a regulatory system for GM crops and food that is distinctly different from that used in the USA. US regulation covers a narrower range of GMOs and is based on assessment of damage rather than of safety. This may have significance if different safety standards become a barrier to trade. There are provisions in existing trade agreements for decisions based on the precautionary principle but these have not been tested. Any disputes would be referred to the World Trade Organisation and in turn to the Codex Alimentarius Commission, a joint Food and Agriculture Organisation and World Health Organisation body. Codex sets international food standards and is the final arbiter where trade disputes depend on health issues. Codex is untested in the area of GM food but has previously shown itself ready to rule against the EU — as it did on the issue of hormones in beef. Codex operates through a series of committees with extensive industrial involvement but little participation on the part of consumers.[77] Codex is only permitted to consider 'valid' scientific reasons before products can be prevented from entering the market in a member country, which raises the questions of what is a valid reason, and who should judge? **We recommend that the Government seeks to establish international agreement on what constitutes a 'valid' scientific reason; and that the definition of validity is based on the precautionary principle. We further recommend that the Government should press for Codex to find a means of reconciling the US, EU and UK approaches to GMO regulation.**

The Quality and Integrity of Scientific Advice

THE EXPERTISE AND MEMBERSHIP OF ADVISORY COMMITTEE MEMBERS

43. The quality of scientific advice to Ministers rests largely upon the expertise of the committee members. Some witnesses argued that both ACRE and ACNFP had insufficient expertise in key areas. For instance, Friends of the Earth claimed that ACRE needed more expertise in soil science, pollen movement and farming practice.[78] Dr Katherine Venables, a member of ACRE and a former member of ACNFP, argued for a wider range of medical expertise, such as toxicologists and public health specialists, to be included.[79]

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[72] Ev. pp. 64-5.

[73] Second Report from the House of Lords Select Committee on the European Communities, Session 1998-99, on *EC Regulation of Genetic Modification in Agriculture*, HL II-I, para 60.

[74] Government Response to the House of Lords Select Committee on the European Communities, Second Report, Session 1998–99, on *EC Regulation of Genetic Modification in Agriculture.*

[75] Q. 470.

[76] QQ. 576-7.

[77] Ev. p. 36.

[78] *See* Ev. p. 210.

[79] Ev. p. 236.

44. Other witnesses pointed to the eminence of the scientists currently serving on advisory committees and the respect that these committees command internationally. MAFF believes that ACNFP members "are all eminent, practising scientists or medical experts with international reputations".[80] DETR states that "ACRE's views are widely respected, both domestically and internationally".[81] The Royal Society of Edinburgh told us "the thoroughness and quality of scientific advice available on this issue is good".[82] The Minister for the Environment, the Rt Hon Michael Meacher MP, was emphatic that the advice his department received from ACRE was of "unquestionably high quality".[83] While expertise in all the main relevant scientific disciplines should be represented on scientific advisory committees, we do not consider that it would be practical, or indeed possible, to constitute committees to include world-class scientific expertise on every aspect of science that might ever come before ACRE or ACNFP.

45. The Green Alliance, among others, argued that ACRE's recently extended remit (see paras 63-4), which now includes examining the cumulative and indirect effects of GMOs in the environment and changes in agricultural practice, will necessitate a change in the expertise represented on the committee.[84] Professor Beringer agreed.[85] The Minister has acknowledged this and has already stated his intention to take the opportunity presented by the retirement of some members of ACRE to review the expertise needed.[86] We welcome this commitment.

46. Under the rules devised by the Committee on Standards in Public Life, ten of ACRE's 13 members, including its chairman, will come to the end of their term of office this year and will not be eligible for reappointment. We are concerned that such a large proportion of ACRE's membership should change at the same time. We regret the break in continuity that such a change will inevitably cause. We note that the Commissioner for Public Appointments has recommended that when a number of simultaneous appointments are made to one body, Departments should recognise the future difficulties of losing a large number of members at any one time and should stagger the duration of appointments.[87] We agree. **We recommend that the Government avoids circumstances where large changes in the membership of scientific advisory committees are required at the same time.**

REPRESENTATION ON ADVISORY COMMITTEES

47. Some witnesses from the food manufacturing and retail industries argued that they should have greater representation on scientific advisory committees concerned with food issues.[88] For instance, the Food and Drink Federation suggested that "much expertise resides within the food industry itself. There is no reason why this should not be exploited within the Advisory Committee structure".[89] Somerfield Stores argued that "the food chain are involved in the consequences" of judgements made by the scientific advisory system and that it needed "therefore to have an input into the decision making process" .[90] We are not persuaded by these arguments. We recognise that a good deal of expertise in this area resides in industry, particularly in the biotechnology sector. Ministers must, however, secure appropriate expertise on advisory committees rather than attempt to give representation to any particular groups. **We recommend that the Government rejects calls to include, as a matter of course, representatives of any particular interest on scientific advisory committees concerned with genetic modification technology.**

48. Both Mr Meacher and Mr Rooker drew a distinction between those scientists serving on advisory committees with research connections to the biotechnology industry and those directly

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[80] Ev. p. 137.

[81] Ev. p. 136.

[82] Ev. p. 253. *See also* Ev. p. 34; Ev. p. 222.

[83] Q. 713.

[84] Ev. p. 179.

[85] Q. 529.

[86] Q. 754.

[87] *The Commissioner for Public Appointments' Guidance on Appointments to Public Bodies*, July 1998, para. 3.68.

[88] Ev. pp. 171, 2, and 198.

[89] Ev. p. 198.

[90] Ev. P. 171.

employed by biotechnology companies. Mr Meacher suggested that, because the presence of biotechnology industry employees on ACRE had in the past brought into question the integrity of its scientific advice, he proposed "to avoid having people directly employed by industry" on the Committee in future.[91] Mr Rooker disagreed. Although none of the current membership of ACNFP is directly employed in the food industry, he told us that "it is not ruled out for the future".[92] A considerable amount of expertise on genetic modification resides with the companies that are actively developing the technology.[93] **We recommend that the Government rejects proposals to bar employees of biotechnology or food companies from serving on scientific advisory committees. It is vital that appointments to scientific advisory committees should continue to be made by selecting people with the most suitable and relevant expertise.**

COMMITTEE MEMBERS' INTERESTS

49. Both ACRE and ACNFP have provisions to ensure that members declare interests and have procedures for dealing with any conflicts of interest which may arise. The procedures for handling conflicts of interest in ACRE are set out in the 1998 ACRE Annual Report: "Members are required to inform the Committee and the Committee decides whether the linkage requires the member to be absent from the discussions. The decisions of the Committee and its reasons for including or excluding the individual are minuted".[94] ACNFP follows a similar practice.[95]

50. These rules have not prevented accusations of partiality. A number of witnesses pointed to apparent conflicts of interest among ACRE and ACNFP members. Iceland plc, among others, told us that the composition of ACRE was biassed towards the biotechnology industry and added that considering "the composition of the ACNFP and ACRE, it is not surprising that such a self interest could arise".[96] Friends of the Earth claimed that "8 out of 13 members [of ACRE] have clear links with the biotechnology industry" and that the chairwoman of ACNFP appeared to be "an additional spokesperson" for the biotechnology industry.[97] Other witnesses, such as Novartis and the Food and Drink Federation, discounted such accusations.[98] Mr Meacher told us "I have no reason to believe that the existing two members [who work in the industry] have not acted perfectly properly" and that "Contrary to views that half of the membership are employed by the biotech industry, that is absolutely not true".[99] Indeed, only 2 of ACRE's 13 members are directly employed in the biotechnology industry. **We condemn the unjust attacks that have been made directly or indirectly against public-spirited scientists who have served the community well on both ACRE and ACNFP. We endorse Mr Meacher's view that the current members of ACRE who are employed by the biotechnology industry have acted properly and with integrity as have members of ACNFP.**[100]

51. We have consistently supported, indeed advocated, Government efforts to encourage scientists in universities and Government research laboratories to commercialise their research and work more closely with industry. Such efforts to exploit the outputs of the research base are aimed at increasing the UK's industrial competitiveness, economy and quality of life. These policies will inevitably mean that few researchers can be said to be free of industrial associations, if indeed it were ever possible to make such a claim. As the Sheffield Institute on Biotechnology Law and Ethics told us, "it is difficult to see how any committee performing a risk assessment or auditing one already done could consist of other than experts in the field, who perforce cannot be totally independent".[101] Industry and Government, rightly, will always seek to work with the best scientists available. **We reject any suggestion that scientists' integrity**

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[91] Q. 746.
[92] Ev. Q. 746.
[93] Ev. p. 184.
[94] Advisory Committee on Releases to the Environment Annual Report No 5: 1998, DETR, published March 1999
[95] Q. 500.
[96] Ev. p. 1. *See also for example* Ev. p. 211; Ev. p. 242.
[97] Ev. p. 211. *See also* Ev. p. 171; Ev. p. 242; Ev. p. 213.
[98] Ev. p. 184; Ev. p. 198.
[99] Q. 746.
[100] Q. 746.
[101] Ev. p. 182. *See also* Ev. p. 184; Ev. p. 191.

is automatically compromised by association with industry. If scientists from academia or the public sector with research connections to the biotechnology industry were to be barred from the Government's scientific advisory system relating to GM crops and food the Government would be deprived of some of the best scientific expertise available. We agree with Mr Rooker that this would be "totally inappropriate".[102]

52. Even accusations of partiality, however unfounded, can damage public confidence in the advisory committees.[103] Scientific advisory committees need a means of handling interests that will protect their members from unjustified claims of partiality and help to restore public confidence. Advisory committees must earn rather than assume public confidence or trust. Government must support its advisers by making clear the checks and balances which exist within the system to prevent partiality and to expose it if it were to occur and by responding robustly to false accusations. This support must be well informed. DETR claim that the high quality of the advice from ACRE is demonstrated "by the fact that there have been no incidents of damage to the environment in any of the cases for which ACRE has advised on the conditions to be attached to a consent" when only small scale trials have so far been carried out shows that this is not always the case.[104] The scientists involved deserve better support than this. Professor Beringer acknowledged that the existing requirements were not stringent enough, telling us that, for the last two years, the members of ACRE have argued that they "feel that the rules on declaring interests are far too weak. The number of shares [in a company that] you need to hold are far too high for most academics even to be able to think of entering their interests".[105] **We agree with the Institution of Professionals, Managers and Specialists (IPMS) which argued that "serious thought ... needs to be given by Government to establish clear guidelines on disclosure of interest [for members of advisory committees] backed by active policies of annual disclosure, clear and transparent procedures for review of disclosures and clear criteria for decisions on whether interests are material".**[106]

Lay Members on Advisory Committees

53. ACRE membership includes an environmentalist and meetings are also attended by an assessor from English Nature. ACNFP membership includes a consumer expert and an ethicist. Many witnesses commented on the roles of these 'lay members' on scientific advisory committees. Professor Derek Burke, a former chairman of ACNFP, told us that in his experience, the consumer representative on ACNFP brought a "change in the way that the scientists approached issues " and could "witness to the robustness and independence of the Committee".[107] Both Mr Meacher and Mr Rooker felt that the role that lay members played on scientific advisory committees was important, arguing that lay representation served to increase public confidence and transparency and to challenge scientific members to explain themselves in ways which can be widely understood;[108] or as the Consumers' Association put it, to ensure that "risks are communicated in a way that consumers can understand and act upon".[109] We recognise that lay members add value to committee deliberations by bringing alterative perspectives. **The Chief Scientific Adviser to the Government has explicitly set out the need "to involve at least some experts from other, not necessarily scientific, disciplines, to ensure that the evidence is subjected to a sufficiently questioning review from a wide ranging set of viewpoints".[110] We agree. We recommend that such individuals should make up a fifth of the membership of advisory committees.**

54. We are, however, concerned about the way in which the role of lay members is defined and acknowledged. Like Mr Rooker we consider that titles such as 'consumer representative'

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[102] Q. 747.
[103] Ev. p. 102. *See also:* Ev. p. 199; Ev. p. 225.
[104] Ev. p. 136.
[105] Q. 532.
[106] Ev. p. 252.
[107] Ev. p. 222.
[108] QQ. 754-5.
[109] Ev. p. 218.
[110] *The Use of Scientific Advice*, para 6.iv.

or 'ethicist' which are sometimes applied to lay members are unhelpful.[111] Moreover, such titles may serve to give false impressions that consumer and ethical interests should be addressed by scientific advisory committees or that they have been adequately addressed. Nor can we sanction the use of the term public interest member which might give the erroneous impression that other members are not appointed to serve the public interest. **We recommend the use of the term lay member to refer to experts from other disciplines serving on scientific advisory committees.**

TRANSPARENCY

55. The Chief Scientific Adviser, in *The Use of Scientific Advice in Policy Making*, argues that wherever possible departments should "ensure that data relating to the issue are made available as early as possible to the scientific community to enable a wide range of research groups to tackle the issue. Scientific advance thrives on openness and competition of ideas"[112]. Openness is certainly important in maintaining a high standard of scientific debate and decision making; however, as a number of witnesses argued, it is also an important factor in maintaining a system which commands the confidence of the public.[113] Despite recent reforms on the part of the Government to increase the transparency of both ACRE and ACNFP there remain some criticisms of a lack of openness and demands for closer scrutiny. Sainsbury's, for instance, told us of a perception that advisory committees are "unnecessarily shrouded in mystery".[114] The Biotechnology and Biological Sciences Research Council (BBSRC) and the Royal Commission on Environmental Pollution both argued that the results of committee deliberations and the advice they deliver should be placed in the public domain as a matter of routine.[115]

56. ACNFP's agendas and minutes are placed on the Internet and discussion papers are available on request. Assessment reports and annual reports are published and "companies submitting approval requests are strongly encouraged to deposit as much of the supporting data as possible in the British Library".[116] MAFF is also considering publishing supporting data and assessment reports on the Internet, "the intention being to invite comments before the Committee offered its advice".[117] ACNFP has also experimented with public meetings when discussing generic issues but not when considering applications. Indeed, Professor Bainbridge was firmly of the opinion that it was not feasible to have open meetings when the committee was considering applications.[118] Similarly, ACRE now places all its minutes on the Internet along with technical reports and other material, including a newsletter, and the advice it delivers to Ministers is placed on the public register.[119] The BBSRC pointed to ACRE as a "good model" in terms of transparency, although we note that ACRE has not held open meetings.[120] While we acknowledge the arguments made by some witnesses that there would be practical difficulties for committees to operate if all meetings were to be held in public, unnecessary denial of access to meetings only serves to invite accusations that committees are secretive because they are not doing their jobs properly. **We recommend that Government continues to drive for further openness by publishing ACNFP and ACRE papers and data (in full and summary form) and negotiating similar treatment of material from similar committees in other EU states. Such information should be published on the Internet for speed and accessibility as well as by conventional means. Summaries should be provided in plain English. We further recommend that, unless applicants can demonstrate that disclosure would cause commercial harm, all future meetings of ACRE and ACNFP should be held in public.**

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[111] Q. 730.

[112] *The Use of Scientific Advice*, para 6.v.

[113] Ev. p. 171; Ev. p.191; Ev. p. 195; Ev. p. 192; Ev. p. 253; Ev. p. 124.

[114] Ev. p. 124.

[115] Ev. p. 191; Ev. p. 195.

[116] Ev. p. 138. *See also* Ev. p. 100.

[117] Ev. p. 141.

[118] Ev. p. 100.

[119] Q. 731.

[120] BBSRC submission to Government Consultation, February 1999.

COMMERCIAL CONFIDENTIALITY

57. Some witnesses raised concerns about increasing the ACRE's and ACNFP's openness on the grounds that the commercial confidentiality of applicants could be compromised.[121] We also note the Consumers' Association view that "commercial confidentiality can be used as an excuse to prevent the disclosure of information".[122] Nevertheless, we recognise the genuine necessity to maintain commercial confidentiality in certain circumstances. Although much of the research behind applications will already have been patented well before an application is made, details of procedure and process can also be commercially valuable. Total disclosure requirements, which would reduce the incentive for companies to invest, would be inappropriate. **We believe that there should be a presumption in favour of public disclosure unless applicants can demonstrate that disclosure would cause commercial harm.**

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[121] Ev. p. 263; Ev. p. 100.
[122] Ev. p. 216.

CHAPTER THREE: THE APPROVAL PROCESS

Sources of Scientific and Technical Data

58. Applications for approving GMOs for food use or for environmental release are supported by the applicant's own data and risk analyses. Some witnesses argued that "committees rely far too heavily on the biotech industry's own data and risk assessments, many of which have not been independently reviewed".[123] Other witnesses rejected such criticisms. Professor Bainbridge pointed out that the majority of members on scientific advisory committees were well experienced in the assessment of scientific data and peer review.[124] Indeed it is the advisory committees themselves that are performing the independent review. Moreover, ACRE and ACNFP do not rely solely on the information supplied by the applicants but also draw on other sources and almost always demand the production of data from applicants in addition to that submitted with the original application. And as Professor Bainbridge also reminded us it is very important to realise that the science we are looking at is science that has been subject to the normal processes of science, that is, peer review.[125] Novartis argues that the risk assessments produced for the regulators are very expensive and require specialist expertise so it is appropriate that the regulators act as examiners for the assessments rather than attempt to undertake the evaluations themselves.[126] **We do not believe that it would be either appropriate or practical for ACRE and ACNFP to do anything other than use an applicant's own data in their assessments. We agree with Novartis that "regulation by review of companies' risk assessments works well in pharmaceutical and pesticide regulation" and this is accepted by the public.[127] Where inadequate information is provided, it is acceptable that further research is commissioned and paid for by the applicant.**

COMMISSIONING RESEARCH

59. Some witnesses suggested that scientific advisory committees should be able to commission underpinning research where there are areas of uncertainty that need resolving.[128] ACNFP already has the ability to recommend areas for MAFF research, as ACRE does for DETR research.[129] While we accept that it is important that both ACRE and ACNFP should be able to call for research to be undertaken, we caution against giving them their own specific research budgets. Budget allocation would put a huge administrative responsibility on the committees and their secretariats but the strategic research needs of scientific advisory committees must be considered. **We recommend that when ACNFP moves under the management of the Food Standards Agency, an appropriate part of MAFF's research budget be transferred to the Agency. Formal links should be established between DETR, the Foods Standards Agency, the Foresight programme and Research Councils so that ACNFP's and ACRE's longer-term basic research requirements can be considered. We recommend that the Minister for Science plays a strong role in ensuring proper coordination between the various research funding agencies and Departmental research programmes in this area.**

Substantial Equivalence

60. Part of the procedure for assessing novel foods rests on establishing 'substantial equivalence' — a methodology developed by the WHO and the OECD and used internationally as a basis for performing risk assessments on novel foods.[130] If a novel food is judged to be substantially equivalent to a conventional counterpart, then it can be considered to be as safe as the conventional counterpart. Establishing substantial equivalence is a complex process involving measurements of the constituents of the GM food and comparing them with a

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[123] *See for example* Ev. p. 211.
[124] Q. 453.
[125] Q. 453.
[126] Ev. p. 184.
[127] Ev. p. 185.
[128] Ev. p. 21; Ev. p. 35.
[129] Ev. p. 139.
[130] Ev. p. 138.

conventional counterpart. If a GM food is found to be substantially equivalent to its conventional counterpart, it will normally be approved. Where a food is deemed not to be substantially equivalent, a more detailed analysis is required.[131]

61. MAFF told us that using this methodology overcomes the "practical difficulties that are associated with trying to test novel foods using traditional animal studies where the nutritional balance of the animals' diet can often be adversely affected"[132]. However substantial equivalence has its critics. The Consumers' Association argued that the approach used to establish substantial equivalence "fails to acknowledge the potential for unintended and unpredictable side effects".[133] Professor James of the Rowett Research Institute pointed out that establishing substantial equivalence "depends on correctly specifying and measuring those elements of concern" which may not always be possible.[134] He also argued that, while there were few doubts that the principle of substantial equivalence was an effective tool for current assessment, "given the extremely large number of GMOs currently under trial, we consider that there is a need to develop new screening strategies which take account of current scientific knowledge and a need ... to have greater assurances on the safety of GMOs".[135] Professor Bainbridge pointed out that ACNFP, rather than the applicant, had discretion over whether to proceed on the basis of substantial equivalence or to conduct a far more detailed analysis.[136] We are not convinced that present GM food safety assessment protocols are flawed. Nevertheless any robust and sustainable scientific advisory system must be prepared to challenge some of its basic tools, especially when doubt is cast on the validity of those assumptions by others. Therefore **we recommend that the Government works with its European partners to investigate new approaches to the safety assessment of novel foods and commission appropriate research.**

The Case by Case Approach

62. ACRE and ACNFP consider each application submitted to them on its individual merits. This approach has led some witnesses to suggest that there is a lack of analysis of the overall, cumulative impact of genetic modification on agriculture, the environment and of the general effects of GMOs in the long term. Professor Burke told us that "the case by case approach has proved inadequate as the number of approvals have grown ... the cumulative implications of successive decisions have not been considered".[137] The British Medical Association told us that the "case by case approach to GMO regulation ignores the cumulative effects of releases".[138] Both the Royal Society and the Royal Commission on Environmental Pollution have also drawn attention to its weaknesses.[139]

ACRE'S BIODIVERSITY REMIT

63. Until last year, ACRE's role primarily involved assessing the direct impact of releasing a GMO into the environment on a number of selected species and the possibility of escaping genes. Indirect effects, such as the impact of the introduction of a GM variety on the overall volume of chemicals used during the growing season did not form part of ACRE's assessments. ACRE's remit has since been widened to include consideration of the effects on biodiversity of GM crops, especially when grown commercially.[140] This change has been widely welcomed.[141] ACRE has established a working group to explore the scope of the issues and we welcome the fact that English Nature and the RSPB have been participating in this process. **We welcome**

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[131] Ev. p. 138.

[132] Ev. p. 138.

[133] Ev. p. 216. *See also* Ev. p. 212; Ev. p. 219; Ev. p. 241.

[134] Ev. p. 39.

[135] Ev. p. 39.

[136] Q. 478.

[137] Ev. p. 223. *See also* Ev. p. 55; Ev. p. 180; Ev. p. 183; Ev. p. 212; Ev. p. 216.

[138] Ev. p. 238.

[139] The Royal Society, *The Regulation of Biotechnology,* February 1999; Ev. p. 195.

[140] DETR, *The Commercial Use of Genetically Modified Crops in the UK: the Potential Wider Impact on Farmland Wildlife. See also* ACRE 1998 Annual Report, March 1999, p. 5.

[141] *See* Ev. p. 64; Ev. p. 179; Ev. p. 261; Ev. p. 221.

the Government's decision to extend ACRE's remit to include consideration of the cumulative impact of GM crops on biodiversity.

64. The introduction and management of GM crops must also be considered in the context of wider concerns regarding the environmental impacts of today's intensive agriculture. These indirect effects are currently not within the scope of risk assessments as required under the Deliberate Release to the Environment of Genetically Modified Organisms Directive 90/220, and consequently ACRE's extended remit may not be matched community wide. Amendments to this directive are currently under negotiation.[142] Mr Meacher told the House of Lords European Communities Committee that "the UK is seeking to make sure that the scope of the Directive and of the environmental risk assessment is well defined and broad enough to cover indirect as well as direct effects of GMOs".[143] We welcome this. **We believe that Directive 90/220 should be amended so that the cumulative effects of GMOs and their management on the environment and on biodiversity are assessed as part of all approvals for deliberate release.**

The Need for More Research

ON ENVIRONMENTAL IMPLICATIONS

65. The need for research to underpin Government policy and decision making on GMOs goes further than the need to meet the specific requirements of advisory committees. Several witnesses commented on the limited amount of scientific results on which to base assessments of the environmental hazards presented by releasing GMOs. The Consumers' Association told us that there is lack of independent research into "the long-term implications of the introduction of GM crops and foods".[144] English Nature supplied us with an extensive list of the research projects they believe need to undertaken, a number of which they identified as being of high priority.[145] Mr Meacher argued that the Government already had a broad portfolio of research projects in this area and that the budget for such research had been increased from about £900,000 in the current year to around £1.2 million over the next two to three years.[146] **We welcome the increase in publicly-funded research into the environmental impacts of GMOs. However, the Government's research programme should also take into account the concerns of organisations such as English Nature.[147] It is disappointing that this is not yet occurring and Mr Meacher has undertaken to address this point.**

A MORATORIUM ON COMMERCIAL PLANTING?

66. There have been calls for a moratorium on the planting of commercial crops although English Nature told us that "we have not pressed specifically for any kind of particular moratorium but what we have said is we need to go more slowly and need much more evidence on some areas ... we are saying that there should be no commercial planting until there is enough evidence to make a better assessment than we can make at the moment".[148] They also told us that they thought this would be around 2003. Other witnesses, such as the RSPB and the Farmers' Union of Wales, supported English Nature's stance, while others have variously called for a three or five year moratorium on commercial planting.[149]

67. Professor Beringer told us that "the field releases that have been done have been so small—about half the size of this room ...that you can make almost no meaningful ecological response from them".[150] The Government has announced three farm-scale trials of GM crops to investigate environmental impacts which will run for the next four years but it has rejected

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[142] Q. 579.
[143] HL Paper 11-II, Q. 603.
[144] Ev. p. 216.
[145] Ev. pp. 70-1.
[146] Q. 737.
[147] Q. 738.
[148] QQ. 335-41.
[149] Ev. p. 261; Ev. p. 194. *See also* Ev. p. 210.
[150] Q. 549.

calls for a moratorium on commercial planting.[151] Mr Meacher assured us that commercial planting of GM crops would not be permitted until the Government was satisfied that it had enough information to make a sound judgement, but suggested that it was not possible to predict with any degree of accuracy when this might be.[152] Yet in February this year the Government stated that "limited and monitored commercial planting of GM crops may start in the UK next year" provided that all regulatory hurdles had been cleared.[153] We do not know what advice the Government might have received that led them to this conclusion. We accept it is difficult to determine precisely when farm-scale trials might result in adequate information, or whether further trials may be required, to allow the Government to make well-informed decisions on the commercial planting of GM crops. We also accept that the only way in which the Government can gather such data is to perform further farm-scale trials in accordance with EU Directive 90/220. It is precisely because of the uncertainty over the length of time that will be required to obtain sufficient data from the farm-scale trials that we believe that calls for a fixed term moratorium are inappropriate. We are, however, convinced that it is impossible for the farm-scale trials to have provided adequate information after only one year. In practice it seems that **there is already a *de facto* moratorium on commercial planting in place. GM crops may not be released into the environment without the necessary consent from the Government and no such consents have yet been issued for commercial growing. Government must make it absolutely clear that commercial growing will not be permitted without adequate information from farm-scale trials.**

ON THE IMPLICATIONS OF CONSUMPTION OF FOOD FROM GM CROPS

68. Some witnesses raised similar concerns regarding the paucity of knowledge of the long-term impact of eating GM food. For instance, the Royal Society of Edinburgh stated that "while the thoroughness and quality of scientific advice on this issue is good, GM foods come almost entirely into a category where scientific evidence is ... partial and constantly under review".[154] The Health Promotion Agency for Northern Ireland, pointing out that the technology which allows the genetic modification of food ingredients was relatively young, argued that "the potential long-term effects on human health ... should be examined".[155] No foods in the human diet can be said with certainty to be risk-free — there are many conventional foods available which have well-documented health risks. Nevertheless, it is foolhardy to introduce any new technology, in any sphere, without adequate follow up assessment of its impact. Professor Bainbridge, who told us that such monitoring had been discussed by ACNFP, pointed out that there was a danger that such monitoring could create the false impression that the Government had doubts over the safety of the GM products it was allowing into the human food chain.[156] This may represent a presentational problem for the Government but it is not a reason to avoid conducting necessary evaluation. The Medical Research Council (MRC) told us "the most effective means of establishing the long-term effect of particular GM foods on human health will be the randomised controlled trial" and that researchers were beginning to develop practical methodologies.[157] **We recommend that the Government supports efforts to find valid ways of monitoring any long-term impact on health of consuming GM foods.**

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[151] *WA*., 15 April 1999, column 301-302.
[152] Q. 775
[153] Letter from the Government, dated 18 February 1999.
[154] Ev. p. 253.
[155] Ev. p. 189.
[156] Ev. p. 87.
[157] Ev. p. 209.

CHAPTER FOUR: THE GOVERNMENT'S USE AND HANDLING OF ADVICE

How is scientific advice weighed against other factors?

69. Governments over the years have asked questions of the scientific advisory system on issues raised by genetic modification which are not scientific in nature. Lay representation on scientific advisory committees has been increased. Specialist studies have also been carried out, such as that conducted by the Committee on the Ethics of Genetic Modification and Food Use (the Polkinghorne Committee) in 1992-93.[158] Dr Cunningham told us that "built into the system now is the provision for those issues to be considered".[159] Mr Rooker said "there are no less than 12 qualified ... ethicists, across the Government's advisory committees in this area. In fact, pull them altogether, and you could have a committee of ethicists".[160]

70. Nevertheless many witnesses argued that the current advisory system relating to GM food and crops fails to address adequately the non-scientific aspects of regulation. Iceland told us that the advice given to Government had "completely failed" to address the "genuine, well understood concerns" of consumers[161]. Greenpeace told us that the scientific advisory system was not sufficiently informed of widely-held public values and nor did it operate in resonance with them.[162] Other witnesses made similar points.[163]

71. We have already acknowledged the importance of lay members on scientific advisory committees and believe that they should be present in greater numbers. However, to argue that the presence of lay members on committees, whose membership is quite rightly dominated by experts in the relevant sciences, can adequately address all other factors that need to be considered is naive. Professor Beringer told us that the role of scientific committees was "to provide an assessment of the risks, not to provide Ministers with an easy political solution. ".[164] The Royal Commission on Environmental Pollution stated that "a clear dividing line should be drawn between analysis of scientific evidence and consideration of ethical and social issues which are outside the scope of scientific assessment".[165] We strongly agree. ACRE and ACNFP are scientific committees; their advice should be restricted to scientific concerns. **Individuals have a range of personal preferences and practices regarding food, some based on ethical or religious grounds. The Government must have a mechanism for addressing these issues; the scientific advisory system does not do so at present nor it is appropiate to require or expect it to.**

The Organisation of the Scientific Advisory Bodies

72. The Royal Society has recommended that "an over-arching body or 'super-regulator' should be commissioned by the Government to span departmental responsibilities and have an ongoing role to monitor the wider issues associated with the development of GM plants" and suggested a range of scientific and regulatory activities for this committee.[166] Other witnesses make a variety of proposals for mechanisms by which the ethical and social considerations surrounding GMOs could be included in the regulatory system.[167] Most suggestions involved the creation of a new body with a wide remit to consider matters arising from genetic modification for food purposes and advise Ministers accordingly. For example, the UK Life Sciences Committee argued that such a body could serve "to ensure that the wider issues on GM technology ... were adequately assessed ... [and that it could] develop ways in which public values can be taken into account".[168] Such bodies cannot, however, replace the responsibilities

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[158] MAFF, *The Report of the Committee on the Ethics of Genetic Modification and Food Use*, 1993.

[159] Q. 813.

[160] Q. 728.

[161] Ev. p. 1.

[162] Ev. p. 54.

[163] QQ. 719-21; Ev. p. 212; Ev. p. 223, Ev, p. 124.

[164] Q. 552.

[165] Ev. p. 269.

[166] *GM Plants for Food Use*, p. 13.

[167] *See for example* Ev. p. 249.

[168] Ev. p. 220. *See also* Ev. p. 171; Ev. p. 12; Ev. p. 88.

of Ministers to take regulatory and policy decisions on behalf of the public. The controversy over GM foods illustrates clearly that, in addition to the scientific advice, Ministers, in deciding on policy and regulation, must take account of the consumer, ethical, economic and political issues associated with introducing new technology. **Ministers should obtain advice on these other, non-scientific, issues but should not seek such advice from the scientific advisory system. The Human Genetics Advisory Commission, charged with reporting on "issues arising from new developments in human genetics that can be expected to have wider social, ethical and/or economic consequences", provides a good model.**[169]

73. We do however see benefit in rationalising the current committee structure. Many of the issues relate very specifically to the organisms under question: ACRE evaluates a GMO when it is to be released to the environment and ACNFP when it is to be used in food. Several witnesses have suggested ACRE and ACNFP meet together formally or that their chairmen should meet regularly to discuss concerns which cross the committees' remits.[170] While we recognise that occasional *ad hoc* meetings between chairmen may be useful, there is scope to formalise the links between these committees and provide a unified and coherent scientific advisory structure relating to the production and consumption of GM food. **We recommend that ACRE and ACNFP are merged to form an integrated committee which considers all scientific issues relating to GM food and crops and advises Ministers, Departments, and in the future, the Food Standards Agency. The specific functions of ACNFP and ACRE could then be delegated to sub-committees.**

74. The integrated committee should also have forward-looking functions — scanning the horizon for, and alerting Ministers to, scientific advances that may necessitate changes to the regulatory or advisory regimes for GM food and crops or identifying areas where further research is required, as the MRC, among others, suggested.[171] **The integrated committee should have a joint DETR, Office of Science and Technology, Department of Health and MAFF secretariat (with MAFF's role moving to the proposed Food Standards Agency when it is established) with a joint budget and joint departmental responsibility. Departmental Ministers should continue to be responsible and the Minister for Science should have a coordinating role.**

Process Quality Assurance for Scientific Advisory Committees

75. As Mr Meacher said, "there is a financial management and policy review which is carried out every five years of these advisory committees" but there is no formal audit procedure for providing assurances that individual scientific advisory bodies adhere to the principles set out in *The Use of Scientific Advice in Policy Making*.[172] Novartis suggested the development of a "process auditor of an independent nature ... to comment and validate the rigour, application and completeness of the committee process itself".[173] We agree that this proposal has merits. **We therefore recommend that the Science Minister, with support from the Chief Scientific Adviser, bring forward proposals for a process audit procedure monitoring the work of all the scientific advisory bodies relating to genetic modification, not only in terms of ensuring that the system works cohesively but also auditing the functions of particular committees from time to time.**

Role of Departmental Officials

76. The scientific advice Ministers receive from advisory committees is normally delivered through secretariats or other departmental officials. Thus, the expertise and integrity of officials is as important as that of the Committee members. There are two issues here. Firstly, are advisory committees getting the support they need from their secretariats to do their jobs

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[169] Human Genetics Advisory Commission terms of reference, Office of Science and Technology.

[170] *See* Ev. p. 223; Ev. p. 225; Ev. p. 12.

[171] Ev. p. 188.

[172] Q.731.

[173] Ev. p. 185.

properly and thoroughly? Secondly, are officials suitably qualified to help ministers assimilate scientific advice into policy?

SECRETARIATS

77. Scientific advisory committees need proper support to enable them to do their jobs properly.[174] Both ACRE and ACNFP are currently supported by scientifically qualified staff but the Rowett Research Institute pointed out that there has been a reduction in the number of outstanding scientists supporting committees in the food safety area.[175] Others drew attention to the overall decline in the size of the scientific civil service.[176] Professor Beringer said that insufficient resources and staff were allocated to the support of ACRE and that this was causing "serious problems".[177] He told us that "nine people ... have to deal with all the work to do with releases in this country, all the interactions within Europe and all the international work and it just is not enough. It has not been enough for nearly three years now...People are working extraordinarily long hours; they are terribly over-taxed".[178] **We find this observation worrying, especially as Professor Beringer's concerns on this matter had apparently not been drawn to the Minister's attention. We recommend that the Government looks closely at the staffing arrangements for scientific advisory committees and commits itself to providing large enough secretariats to ensure the efficient working of the Committees. The cost of extra staffing will be small compared with the cost of failure of the advisory system.**

SCIENTIFIC EXPERTISE IN THE CIVIL SERVICE

78. IPMS believes that scientific expertise in the civil service is being degraded. It argues that the separation of the central civil service from Government laboratories and scientific next steps agencies has reduced the natural flow of scientists between active science and scientific policy making.[179] We have not looked at this issue in detail in this case study but we recognise this as an area of concern. It is an issue to which we intend to return in our overall inquiry into the scientific advisory system.

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[174] *See* Ev. p. 253.
[175] Ev. p. 34.
[176] Ev. pp. 250-2
[177] Ev. p. 102.
[178] Q. 542.
[179] Ev. p. 250.

CHAPTER FIVE: CONCLUSIONS

79. GM technology has the potential to deliver significant benefits to the UK through its application to agriculture and food both in terms of improving the quality of the food we eat and in economic terms. The use of GM technology, like the use of any other new technology, also presents a number of concerns which need to be identified, evaluated and minimised. The role of the scientific advisory system is to inform Ministers' decision making on these matters but it should not be expected to provide the Government with solutions to political dilemmas. We do not believe that the scientific advisory system addresses ethical or value-based judgements. Nor do we believe that it should. Ministers must take such considerations into account in their decision making but must look to other sources for advice on non-scientific matters.

80. Scientific advice is delivered to Ministers who must make decisions based on that advice in the context of wider considerations including their assessment of public values. Yet people's values, which, once formed, may be lasting, can be shaped and modified by information and debate. It is therefore essential that information provided to the public is accurate and debate well-informed. Labels such as 'Frankenstein' or 'Mutant' and sensational media reporting distort that debate and jeopardise rational policy making. In this context it is important that

- the Government should promote the public understanding of science vigorously;
- scientists involved in research should be equipped to respond effectively and competently to media pressure;
- media editors and reporters should establish a code of practice for dealing with scientific information which should be endorsed by the Press Complaints Commission and the Broadcasting Standards Authorities.

81. We have been impressed by the robustness and expertise of both ACRE and ACNFP and have no found evidence to suggest that the quality of the advice they deliver to Ministers is other than high. We have identified some structural weaknesses in the advisory system and have made recommendations to address these. In particular, we believe that it is necessary to merge ACRE and ACNFP into an integrated body with the ability to look ahead and to identify scientific developments which may impact on the regulatory regime or Government policy.

82. No human activity is risk-free. We have seen no evidence to suggest that the risks associated with growing GM crops or eating GM crops are high enough to justify calls that have been made for a moratorium; indeed we have seen no evidence to suggest that the risks associated with eating GM food are any higher than those associated with eating conventional food. There are widespread concerns about the impact of intensive farming practices on the environment and biodiversity. If properly managed GM technology can offer a solution to some of those problems although we accept that any such solutions will require responsible management of the technology. It is for the regulatory system to ensure that GM technology is exploited responsibly and therefore we welcome the extension of ACRE's remit to include indirect impacts on the environment and biodiversity. But science cannot produce the clear-cut certainties that would seem to be required to reassure some organisations that have set their face against the technology. There are, quite naturally, areas of uncertainty where further research is required.

GLOSSARY

ACGM	Advisory Committee on Genetic Modification
ACNFP	Advisory Committee on Novel Foods and Processes
ACRE	Advisory Committee on Releases to the Environment
BBSRC	Biotechnology and Biological Sciences Research Council
BSE	Bovine spongiform encephalopathy
DETR	Department of the Environment, Transport and the Regions
DNA	Deoxyribonucleic acid
GM	Genetically modified
GMO	Genetically modified organism
HSE	Health and Safety Executive
IPMS	Institution for Professionals, Managers and Specialists
MAFF	Ministry of Agriculture, Fisheries and Food
MRC	Medical Research Council
OECD	Organisation for Economic Co-operation and Development
RSPB	Royal Society for the Protection of Birds

ANNEX

EU Regulations on Labelling GM Foods

EC Novel Foods and Novel Food Ingredients Regulation (258/97) provide for special labelling:

— if a GM food is judged not be equivalent to the relevant existing (ie non-GM) food;

— if a GM food contains material that might give rise to health concerns (eg a protein from a known food allergen such as peanuts);

— if a GM food contains material that might give rise to ethical concerns (eg animal genes in vegetable products).

In addition all foods which contain or consist of GM plants themselves should be labelled, although because segregation of GM and conventional products may not be possible, the Regulation recognises that a label stating that GMOs may be present will suffice.

PROCEEDINGS OF THE COMMITTEE RELATING TO THE REPORT

WEDNESDAY 12 MAY 1999

Members present:

Dr Michael Clark, in the Chair

Mr Nigel Beard	Dr Ashok Kumar
Dr Ian Gibson	Mr Ian Taylor
Dr Lynne Jones	Dr Desmond Turner
Mr Nigel Jones	Mr Alan W. Williams

The Committee deliberated.

Draft Report (Scientific Advisory System: Genetically Modified Foods), proposed by the Chairman, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs Nos. 1 to 82 read and agreed to.

Resolved, That the Report be the first Report of the Committee to the House.

Ordered, That the Chairman do make the Report to the House.

Ordered, That the provisions of Standing Order No. 134 (Select committees (reports)) be applied to the Report.

Several papers were ordered to be appended to the Minutes of Evidence.

Ordered, That the Appendices to the Minutes of Evidence be reported to the House.

Several papers were reported to the House.

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1. Appendices to Memorandum submitted by Iceland plc
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